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FAMINE EARLY WARNING SYSTEMS NETWORK TECHNOLOGY SUPPORT CONTRACT (FEWS NET TSC)

MARKET PRICE DATA MANAGEMENT: WHITE PAPER

MARCH 1, 2012

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Introduction

Market price information plays an important role in the analysis of early warning data. While not a definitive indicator on its own, a price provides an indication of the level of supply (availability) and of the relative demand of a commodity. This information feeds into food security in several ways. First, at the household level, price is a determinant of the quantity of food one can purchase which is related to food access. Second, at the producer level, price is a determinant of the quantity of food one is incentivized to produce, which again feeds into availability.

A few key trends have amplified the importance of market data in food security analysis. First, prices of basic food items have gone up significantly in the both the international and local markets. This increase means that it is more difficult for consumers with little buying power to purchase the food they need for survival. Second, there has been increased volatility in prices. This volatility impacts the production decisions of those growing food, and thus can lead to supply issues. Finally, as markets become increasingly interconnected, external price issues tend to have a greater impact on local markets, often arbitrarily destabilizing the food security of already vulnerable populations.

FEWSNET provides insightful and much-used reporting on market price data, namely in the form of their Price Watch report series which, at the country level, reports on trends and anomalies in key markets and commodities. Currently these data are collected, managed, and analyzed using a series of Excel spreadsheets. While the process has worked efficiently for many years, it now is becoming unwieldy. The spreadsheets are large and cumbersome to manage and they will only get larger as FEWSNET adds commodities and markets. Moreover, additional spreadsheets will be needed as FEWSNET adds remote monitoring countries to the analysis. The Markets and Trade (M&T) team already handles many spreadsheets each month. As these spreadsheets grow and multiply, the entry and the processing of the data becomes increasingly time consuming and vulnerable to error. One primary argument for introducing a technology solution is that it will allow the Markets and Trade group and the National Technical Managers (NTMs) to spend more time analyzing the data and less time managing it.

This report provides a brief overview of the existing processes and challenges of gathering, analyzing and reporting on FEWSNET market price data and then presents recommendations for FEWSNET to consider.

Existing Price Data Collection Process

The following sections outline how price data is gathered and processed and identify the challenges and limitations of the existing system.

Collecting Price Data from the Field

Each FEWSNET National Technical Manager (NTM) manages the collection of price data for her own region or country of responsibility. This process can take many forms. Some examples we came across:

- NTM pays field representatives to collect the data on a regular basis (e.g. weekly, bi-weekly, etc.). This information is then keyed into a standard formatted excel spreadsheet that the NTM manages.

- NTM relies on approved data coming in the form of a report (PDF, Excel, Work, etc.) from a government ministry or some other source. This information is in turn re-keyed into a standard formatted Excel spreadsheet managed by the NTM.

- NTM has a relationship with field representatives hired by a government ministry with whom they can call to get updated price information. Again, this data gets keyed into an excel spreadsheet.

In all these cases, at some point data must be keyed into an Excel spreadsheet[1]. The process is potentially time-consuming and laborious for the NTM. However, given the nature of this data collection and the reliance on other partners for the data, this step is hard to eliminate.

Sending Price Data to the Home Office

While the NTM may collect daily, weekly, or bi-weekly price information, the data needed to create the FEWSNET market reports are average monthly prices. As such the Markets and Trade team has defined a process on how to calculate the averages and send the required data back to the home office.

Each month the Markets and Trade team sends a *Country Master* spreadsheet to each NTM to complete. The *Country Master* spreadsheet contains the entire monthly history of prices for that country. It also includes other information such as annual and 5-year price averages, and various price charts.

The NTM calculates her country's commodity price averages by market and either keys or copies these prices into the *Country Master* sheet. She then sends the completed sheet back to the home office.

The NTMs have until the 15th of the following month to get these data into the home office. For instance, January data is due February 15th.

Challenges:

- The country master sheets are large files that are sent back and forth each month over email, clogging email boxes.

- The calculation of weekly into monthly price averages and the cut/paste from one excel sheet to another are prone to error (e.g. key in the wrong numbers, copy over formulas, etc.)

- The process is time consuming and creates a lag of around two weeks before the home office has the data.

Home Office Data Process

The home office receives a *Country Master* spreadsheet from each FEWSNET office. For each of these files, the Markets and Trade team conducts a series data validation steps, looking for types, inaccuracies, etc. If they find inconsistencies, they must communicate back and forth with country office to clear up the issues. Once the data are validated, the M&T Team copies each *Country Master* spreadsheet into a *Global Master* workbook that maintains a tab for each country.

[1] We have not done a systematic poll of all field offices. There could be cases where the NTMs extract data directly from a database system. In this case any solution would need to provide them with some type of upload facility so that they need not re-key data

Within this *Global Master* data file the M&T Team conducts several other manipulations using complex formulas to develop the data formats required for reporting. These processing steps are prone to error as rows, cells, and files are being recombined in different ways. From the time the M&T team gets the data from the NTMs, it takes on average 3 weeks to process and get out the reports.

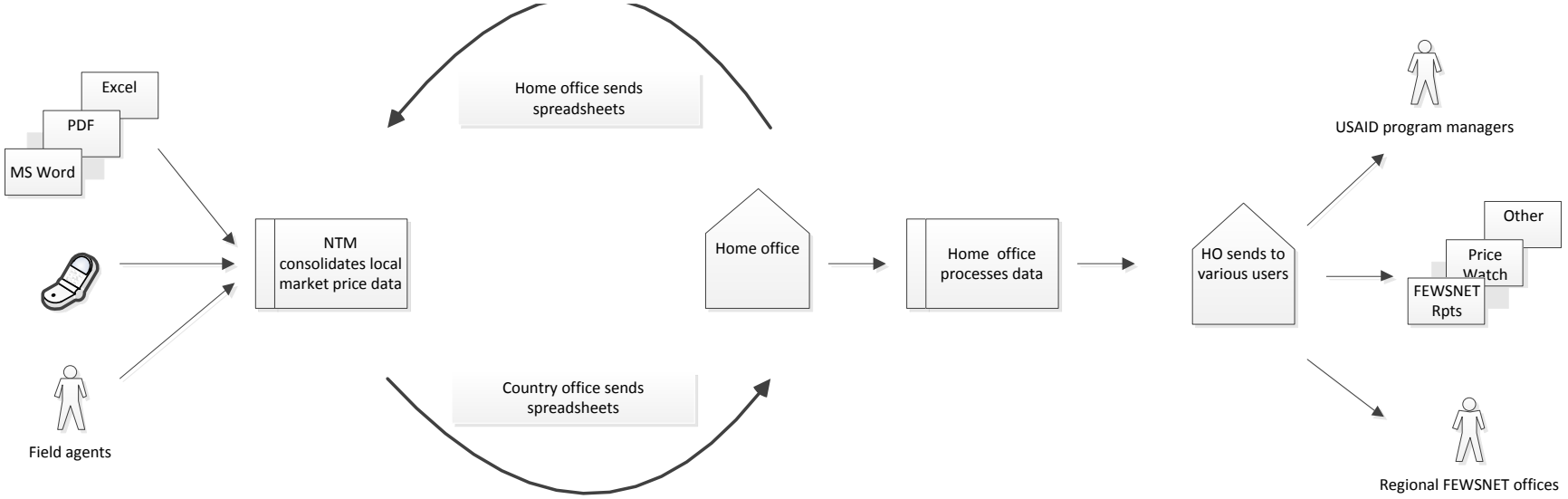
The primary issue is that real time changing circumstances on the ground in an 'at risk' country/region often necessitates more timely information on prices. Moreover, an argument can be made that with a proper database solution, the M&T team can spend more time doing analytical analysis to support the field and USAID rather than processing the data.

Challenges:

- Management of multiple excel spreadsheets is prone to error and time-consuming
- Each month all the data files are stored to maintain backups…lots of storage
- The nature of the processing means that there exists a long lag-time between when the data is collected and when it can be used by the team for analysis.
- The formulas to needed to create the Price Watch data are based on referenced data. When you hit the end of the year and switch to a new year or when add a commodity or market, you need to rework all the references and redo all the reports. This process is again, very time consuming for the M&T team.
- The formulas in excel are based on referenced data and are therefore prone to crash if there is missing data.
- With the new push to develop regional pricing and the addition of remote monitoring countries will make the current system unmanageable.

Figure 1 presents a simplified model of the current workflow. It is an iterative process that involves the back and forth transmission of spreadsheets via email. With the current and future planned scope of the FEWSNET activity, the existing process is not sustainable.

Figure 1: Current Workflow Diagram



Market Data Currently Tracking

The below table details the market data the M&T currently collects and additional attributes they would like to collect in the future. This list is not necessarily comprehensive but provides an indication of the necessary scope of any database solution.

Attribute	Status	Description
Commodity name	tracking	
Unit	tracking	
Price	tracking	
Date	tracking	
Currency code	tracking	
Currency exchange rate	tracking	
Country	tracking	
Market location (city)	tracking	
Trade basin (area of city)	tracking	
Market Name	tracking	
GPS coordinate (lat/long)	tracking	
Price type (wholesale/retail)	tracking	
Consumer price index (CPI)	tracking	
Reference year	tracking	Year of prices that resemble a crisis to use as a reference point.
Comments	Would like	Comment box on entry to track issues with price for that day/month
Status field	Would like	Add a status field to indicate that the price entered has been vetted and approved.

Table 1. Market Data Currently Tracking

Price Man - Lessons Learned

Discuss with Felix:

- How it worked
- What data it captured
- What people really liked about the system
- Why it was abandoned
- How we might build/leverage this design using updated technology

FAO GIEWS

In our discussions, several people raised the question about how other organizations collect and visualize this type of data. In particular, people mentioned the price data features of FAO's Global Information and Early Warning System (GIEWS). While we have not investigated this tool in depth, the site appears to have some useful visualization tools (see the Annex). However, the data within the system is quite sparse. In the interest of partner collaboration, some have suggested that we investigate

possible ways FEWSNET might partner with FAO or other organizations in data sharing. Some questions we might want to consider

- How does FAO get data into their system?
- What is the frequency of these uploads?
- Do they have an existing price data entry tool that we might leverage?
- Do we lose too much control over the process should we decide to leverage their existing system?
- Does it make sense for FEWSNET to maintain its own price data management system but perhaps leverage the FAO visualization tool? What are the pros and cons of this approach?
- Would data sharing reduce or increase our visibility?

Currently, is not at all clear whether or not there is a path towards collaboration. However, since FEWSNET has articulated a focus on partnerships, exploring these questions could prove useful.

Recommendations

To create a robust and scalable solution for tracking market data, we recommend developing a web-based tool that allows users globally to both enter and extract needed information. Creating an online data solution will address many of the limitations of the existing system by:

- Eliminating the need to manage, store and transfer multiple spreadsheets
- Centralizing market data for easier access and analysis
- Reducing time lags in reporting
- Reducing data entry/calculation errors through built-in validation
- Allowing for scalability in countries, markets, and commodities

Any technology-based solution should help eliminate steps in the workflow, allowing users all along the value chain to increase productivity.

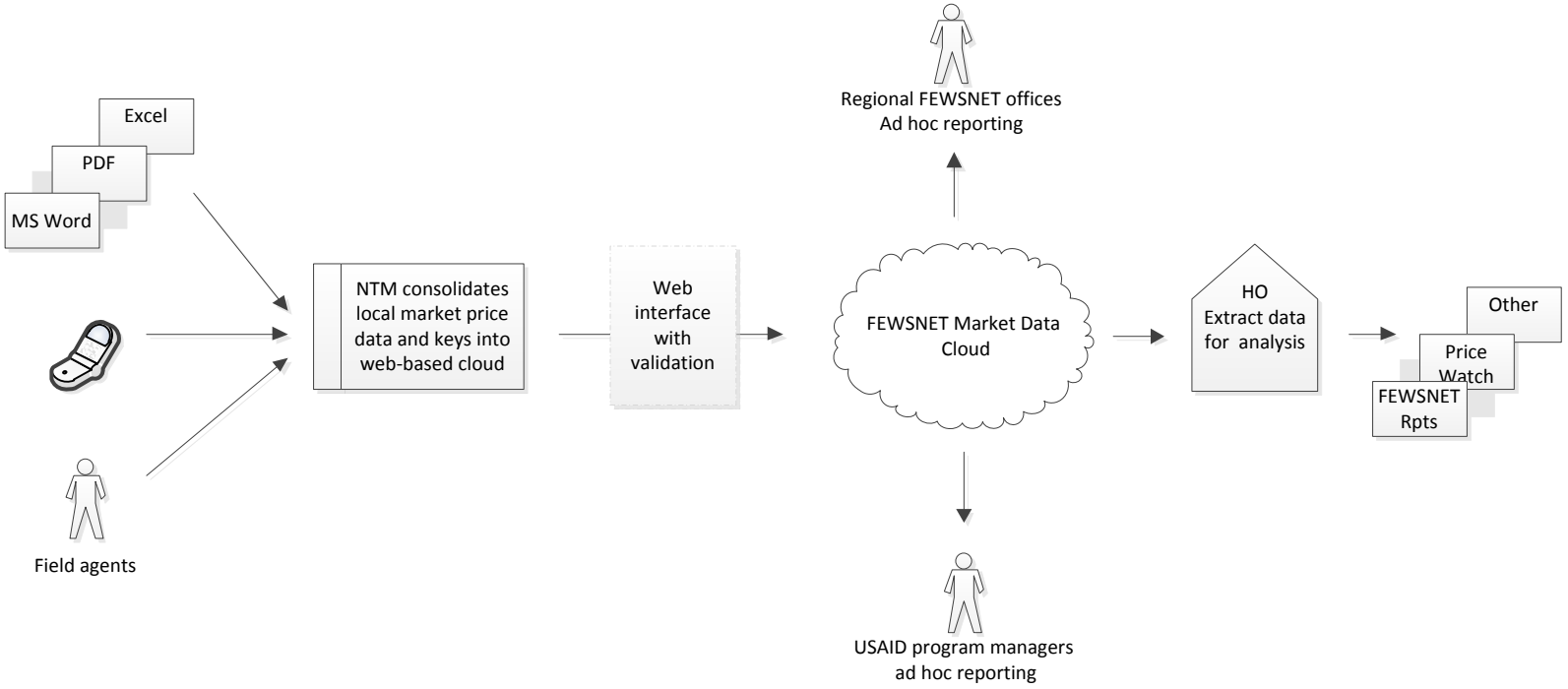
Figure 2 presents a proposed workflow that involves some type of technology solution. The key steps of this solution would involve:

- Creating a simple data entry interface to allow NTMs to key in market data
- Creating a simple admin site for the M&T team to 'approve' price data (validation process), add new countries, markets, etc.
- Defining a set of permissions to determine who has access to what data
- Creating a simple navigator for people to select the data they want to extract to excel
- Potentially creating standardized reports for M&T regular reporting (e.g. graphs, tables, etc.)

- Considering an offline feature that allows users to enter data to be synched later when the internet is working.

An indicative data entry screen is presented in the Annex.

Figure 2: Proposed Workflow Diagram



Next Steps

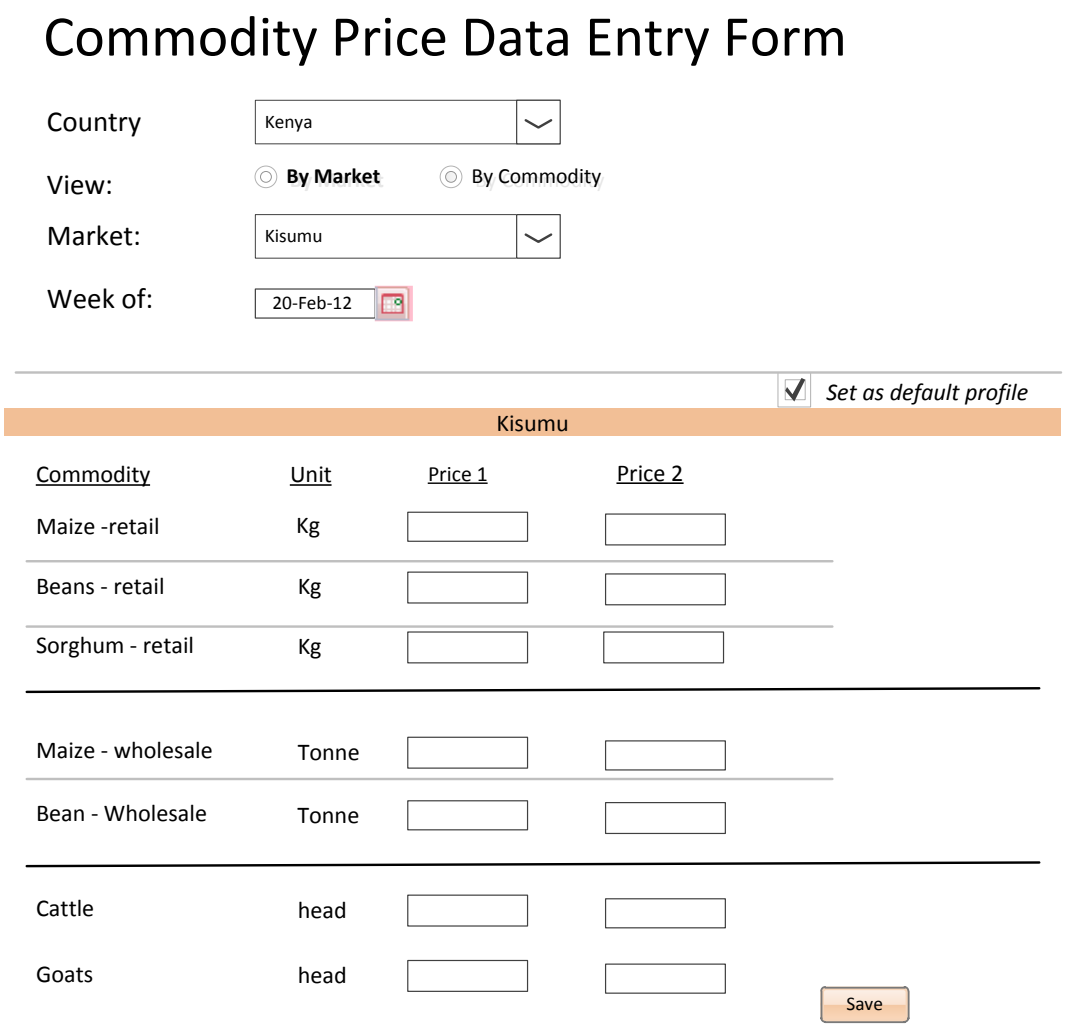
If this project is of interest to FEWSNET, the following steps are recommended:

- Determine whether or not this project is a priority for FEWSNET
- If yes, do a full business process review at the conclusion of which we have a detailed system specification document. This process should be iterative with ongoing participation of the Home Office, selected NTMs, and USAID.
- Get price and time quotes on what it would take to build out the specified system

ANNEX

Sample Data Entry Form

The screen displayed here is just indicative of what is possible. Obviously, any design should take into consideration the experiences of Price Man and input from the Home office and NTMs so that we capture all scenarios for gathering/entering data. However, I have found that is often useful to have something tangible off of which to bounce ideas.



FAO GIEWS Food Price Data Tool

Below is a picture of the FAO GIEWS Food Price Data and Analysis Tool.